



Aerospace & Defense PLM Action Group

Multi View BOM



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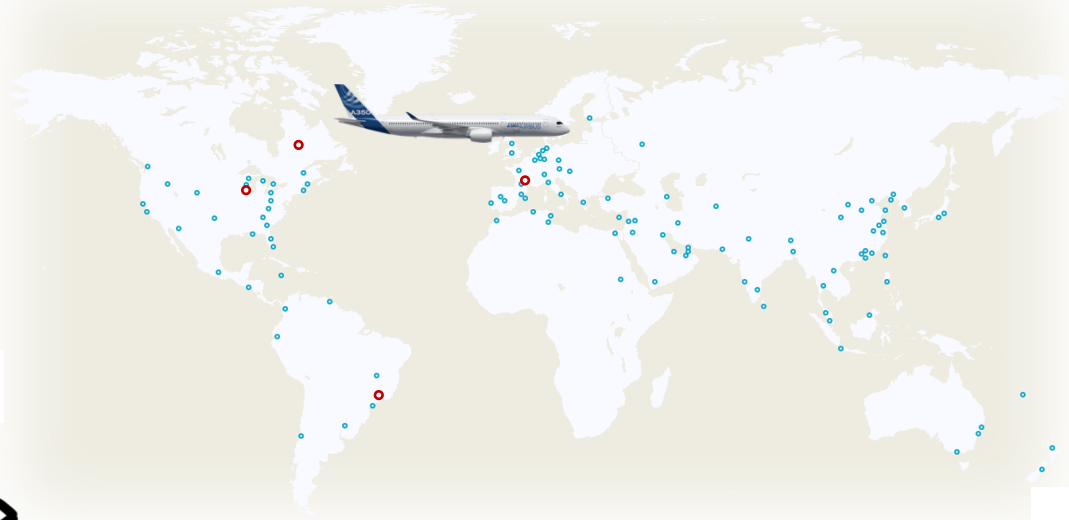
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The story



- Aerospace manufacturers independently developed PLM processes and tools to support **Engineering and Manufacturing Bill of Materials** largely without industry exchange
- Suppliers simultaneously working for OEM manufacturers with very different processes and tools baseline
- All developing high cost PLM customized solutions to solve similar issues because there is no industry standard or best practice.



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- Aerospace & Defense PLM Action group created in 2014 to address common issues faced by aerospace manufacturers.
 - A&D Primes & Engine Manufacturers
 - Advocate for industry best practices
 - Promote common requirements to standards bodies



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The team

The team: in person workshops



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The team: in person workshops

First time we have shared openly the PLM processes and functions used internally for managing Multi-BOM configuration



March 2017
Toulouse, France

September 2017
Seattle, USA



March 2018
Paris, France

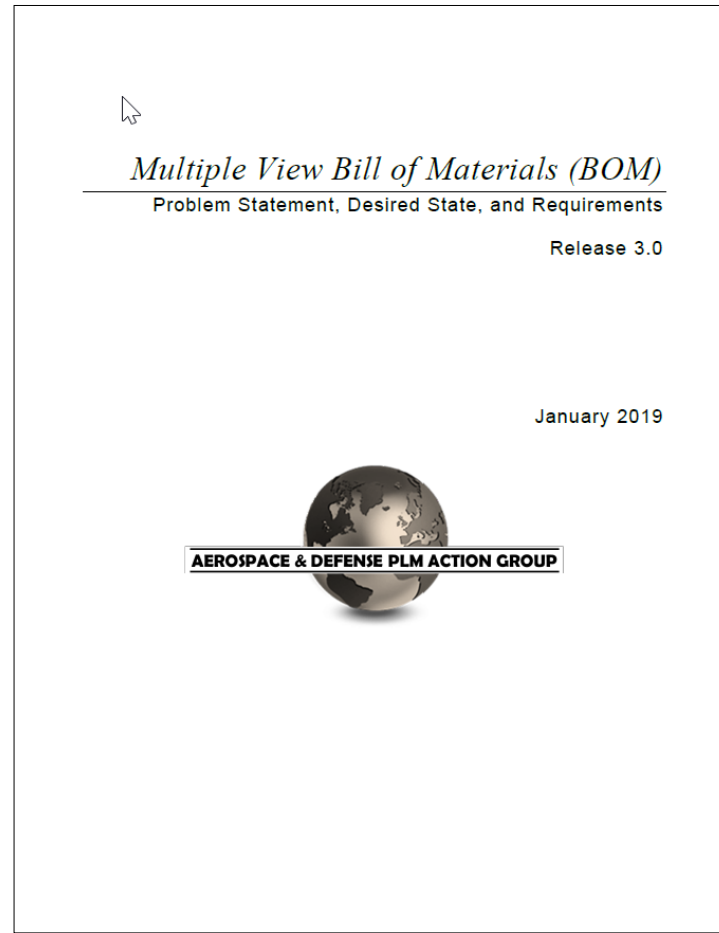


March 2019
Toulouse, France



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The outcome so far



Glossary

**E-BOM to M-BOM
accountability**

Data Exchange

Future subjects

CIMdata® Available in: www.cimdata.com

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ATA SPEC 2000

**A/C Identification
Number**

EIA 649

**Unit
Identifier**

Airbus

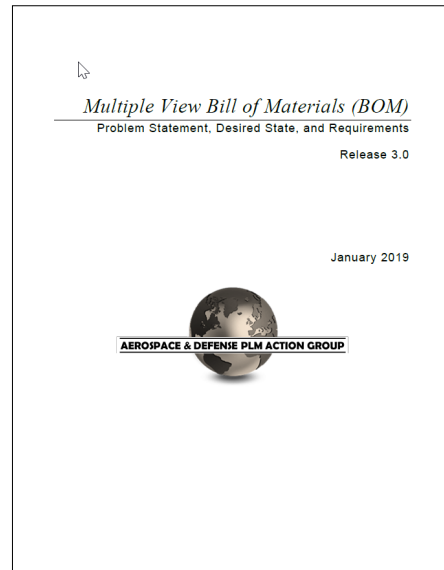
MSN

Boeing

Line Unit

Gulfstream

Tail Number

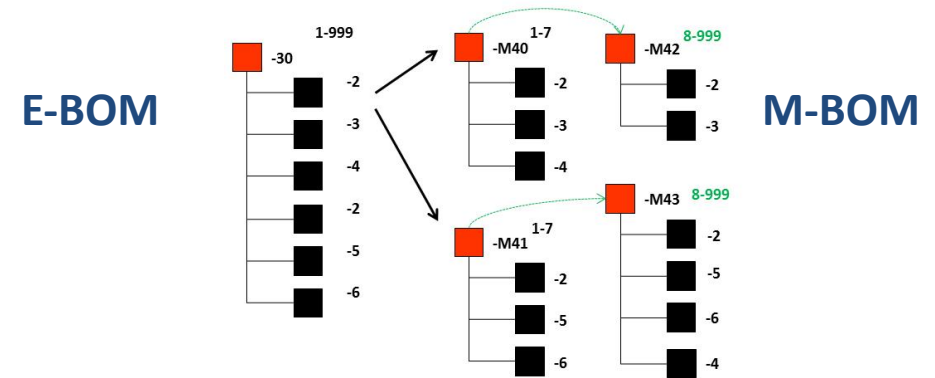


Acronym or Term	Meaning	Source of definition	
150% BOM	Union of all EBOM elements for all Aircraft Identification Number of specific product.	OWN	Super BOM, Overloaded BOM,
Accountability Map	The Accountability map is a set of rules that evaluate the authority effectivity and ensure / enforce that manufacturing effectivity changes are equal to the authority effectivity. Rules also cover quantity and part number, manufacturing only changes, substitute and optional parts checks to ensure compliance between two structures such as e-BOM, m-BOM, BOP, and S-BOM if any.	OWN	
Aircraft Identification Number	The manufacturer's permanently-applied serial number for the airframe.	ATA_SPEC-2000_2011-01	MSN
Alternate Part Number	An alternate part number identifies a part which fully meets required functional and 106, 2200,	ATA_SPEC-2000_2011-01	Interchangeable, Optional part,
As Built	The configuration of a product instance after completion of build per the "as planned" baseline as reflected in records of completed work. May differ from "as planned" baseline due to resolution of nonconformance and other exceptions reflected in the records of completed work which comprise the "as built" baseline.	As per LOTAR	
As Designed	The approved design (under revision control). Differs from "in development" in that it only includes design at a status which authorizes use in the "as planned" baseline.	As per LOTAR	



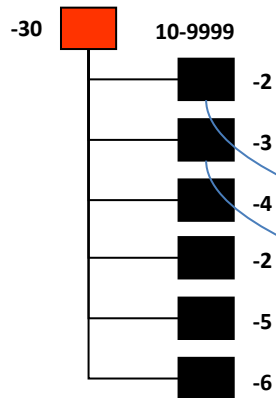
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Provide a system to reconcile and enforce accountability between E-BOM and M-BOM



The M-BOM has two key areas relevant for accountability:

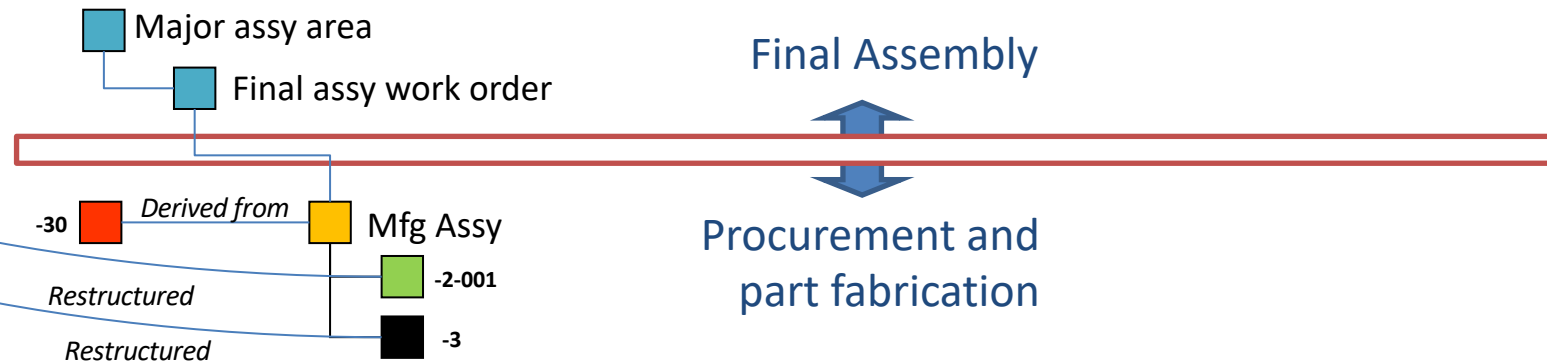
E-BOM



M-BOM

2

Parts consumed into an airplane that accounts for its completeness, configuration being installed

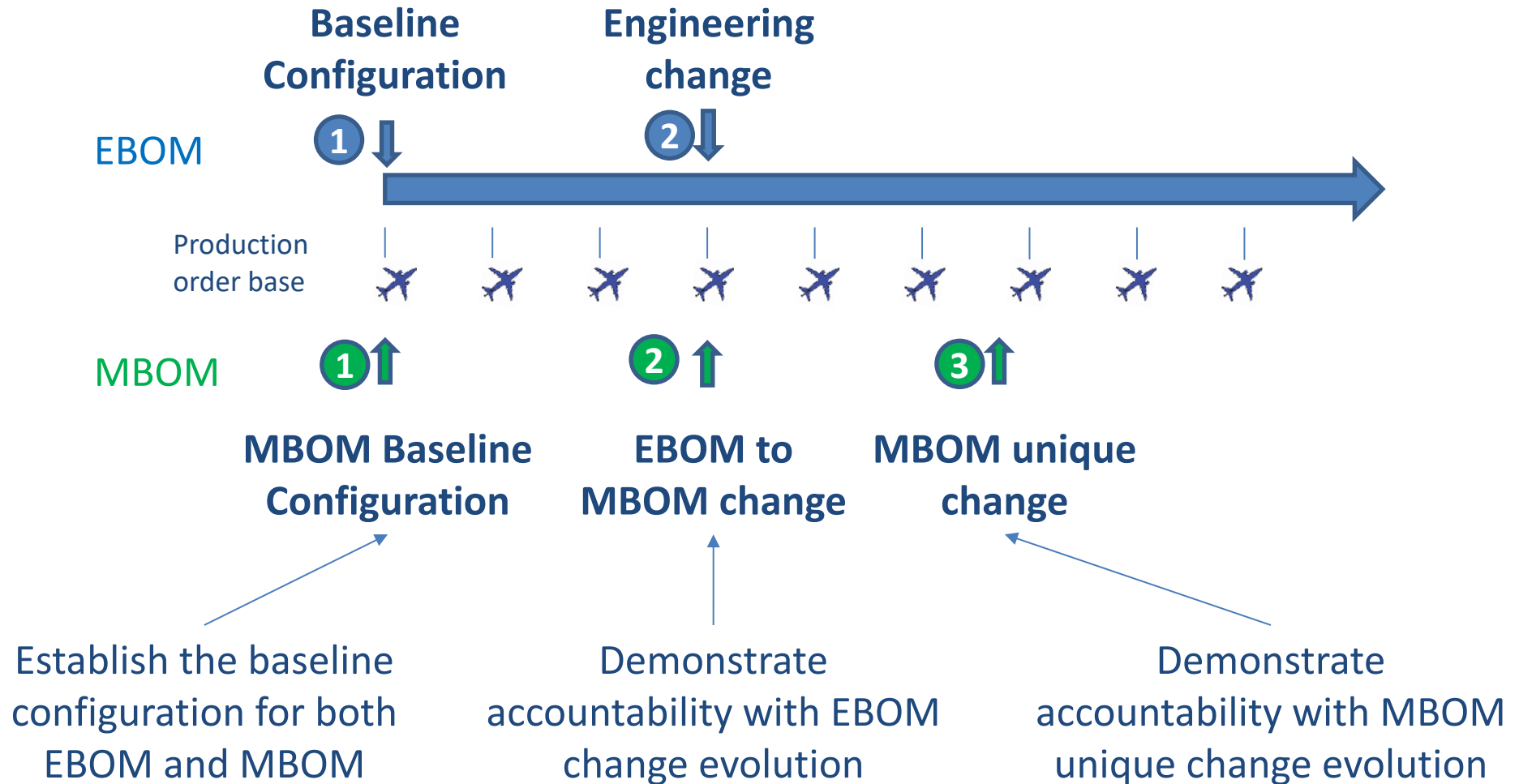


1

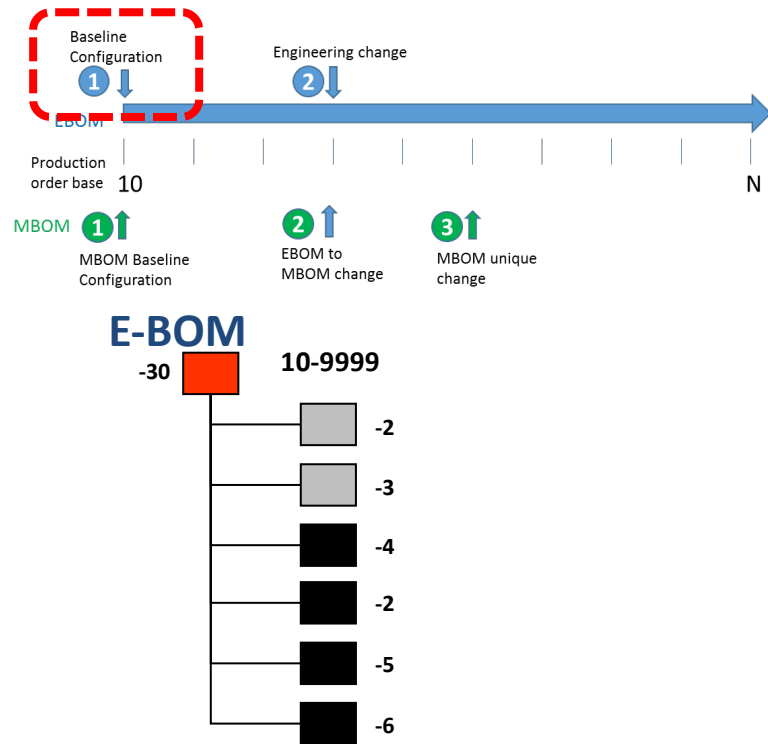
Parts ordered from suppliers and internal fabrication sites, configuration being procured

Accountability change scenario

Accountability becomes more complex as change is introduced.

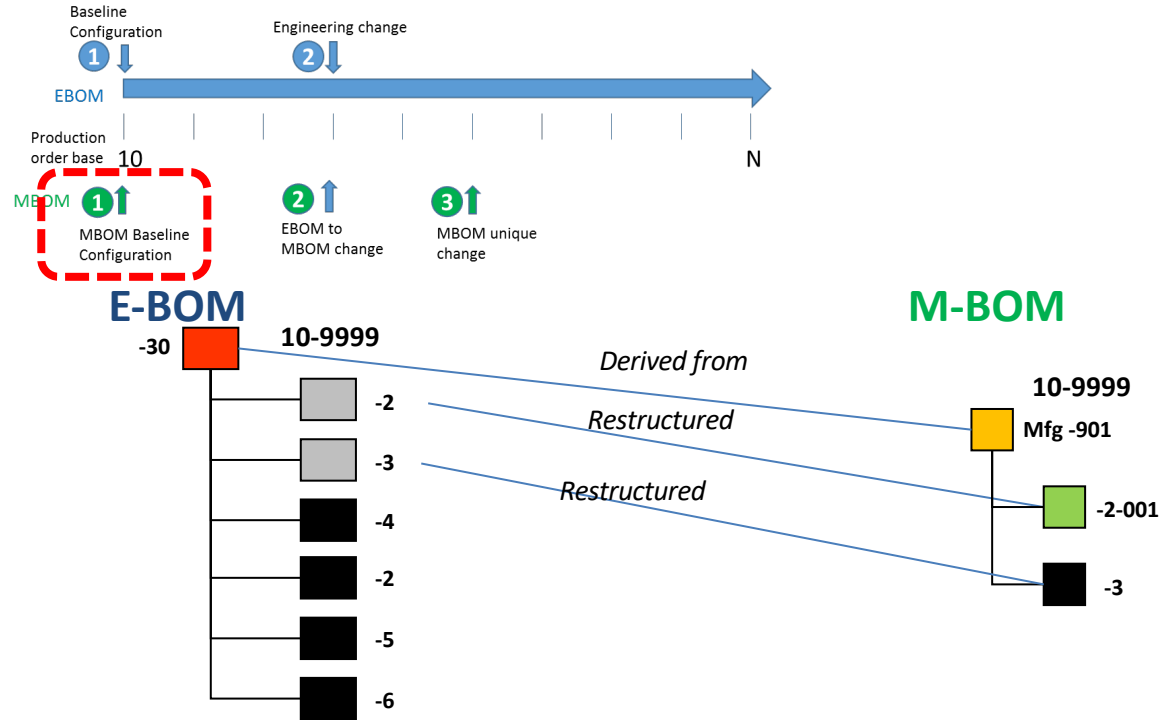


Accountability change scenario



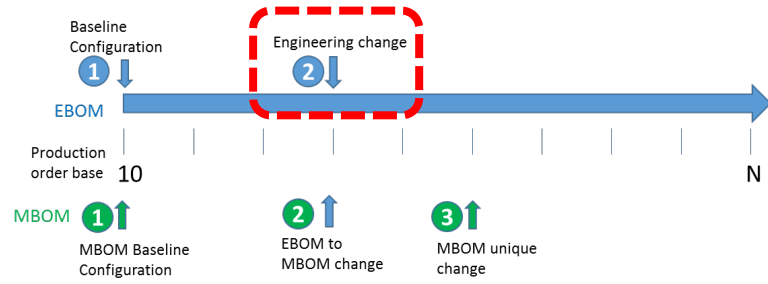
- Design -30 released from aircraft 10 and on.

Accountability change scenario

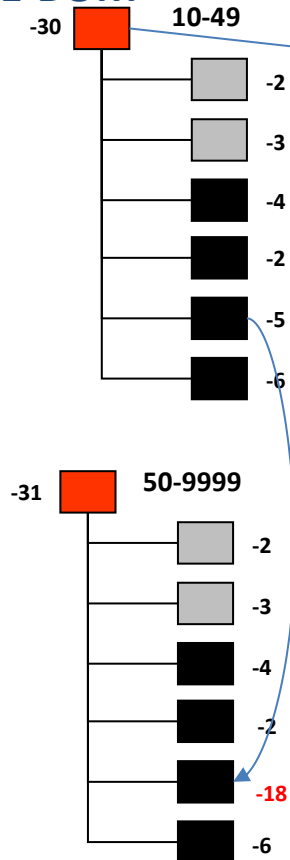


- Design -30 released from aircraft 10 and on.
- Part -2 is restructured: -2-001 omits pilot holes.
- New Manufacturing Assembly -901.

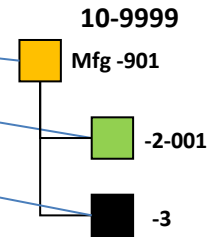
Accountability change scenario



E-BOM

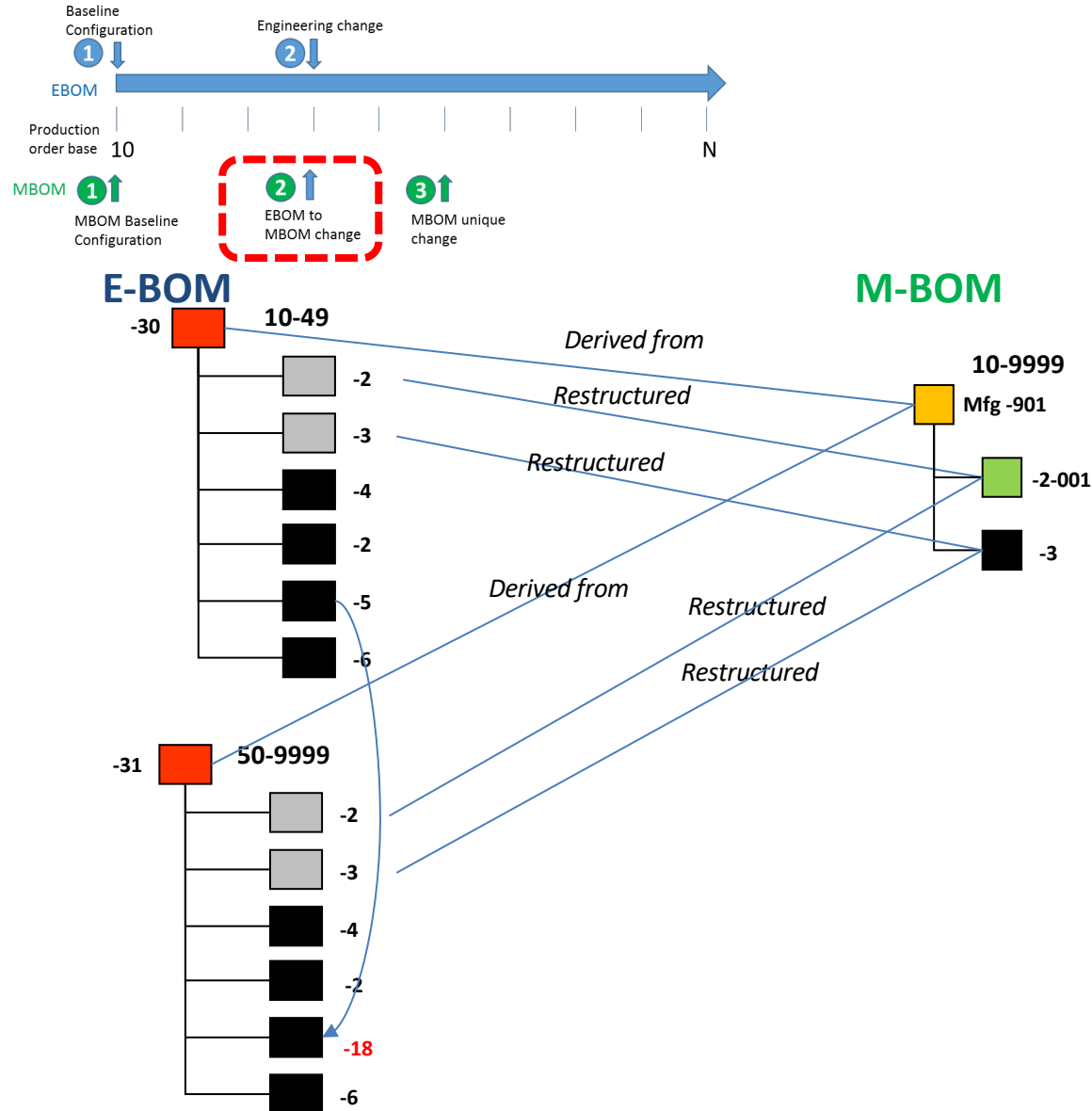


M-BOM



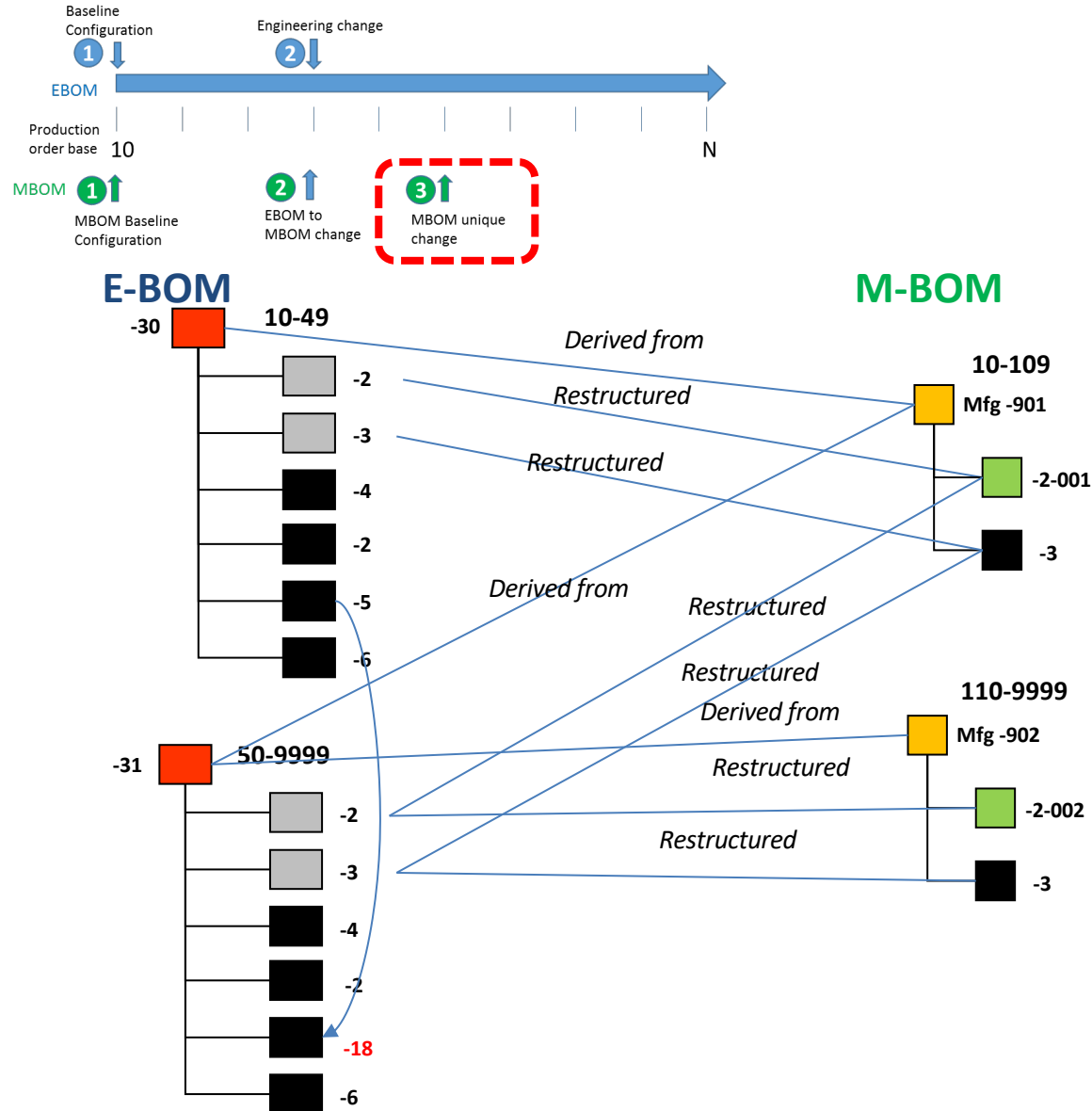
- Design -30 released from aircraft 10 and on.
- Part -2 is restructured: -2-001 omits pilot holes.
- New Manufacturing Assembly -901.
- Part 5 replaced by 18 from aircraft 50 and on.

Accountability change scenario



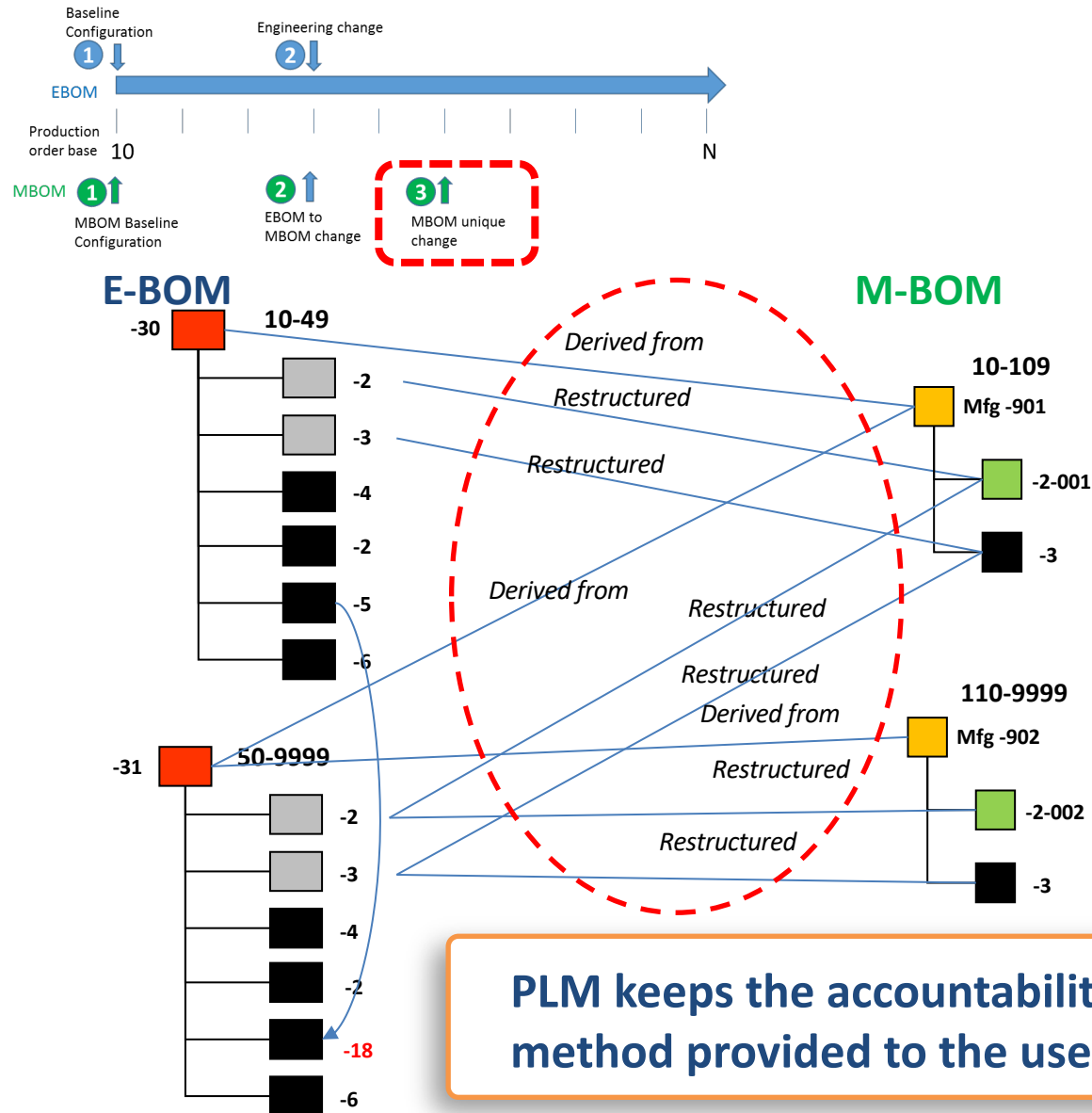
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- M-BOM restructuring between -30 and -31 is common. PLM shall notify and allow the user to automatically re-apply the original restructures in the -30 to the new -31.

Accountability change scenario



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- New restructuring, manufacturing only change, aircraft 110 and on.

Accountability change scenario



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PLM keeps the accountability map current based upon the system enforced method provided to the user for restructuring

**What about PLM
Editors?**

PLM EDITORS Meeting



SAP, Siemens, Dassault Systemes, PTC and Aras

Multi View BOM feedback about PLM Editors

- They understand well Paper technical requirements, but might be underestimating their complexity
- Key requirements not addressed: effectivity based full E-BOM to M-BOM reconciliation prior M-BOM release.

PLM Editors feedback about Multi View BOM

- Position Paper content to be improved, specially effectivity management, very vague.
- Stick on requirements only, avoiding being prescriptive about technical solutions.
- Requirements apply to relationships with other OEM and Suppliers.
- Several of the technical subjects are missed in standards



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What's next?



Multiple-view BOM Solution Evaluation Benchmark

- In depth exposure to critical multi-view BOM requirements of 10 major aerospace & defense OEMs
- Assess performance and identify gaps in PLM Editors current multi-view BOM solution in a non-competitive setting
- Contribute to the refinement of AD PAG multi-view BOM use cases
- Influence future multi-view BOM compliance protocols that will be adopted and exercised by CAX-IF type organization(s) sponsored by the AD PAG
- Receive acknowledgement of PLM Editors contribution to advancing the state of the art of multiple-view BOM management in future AD PAG publications and events



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